REMARKS

This responds to the Office Action mailed on January 23, 2007. By this response, claims 1, 15 and 40 were amended. No claims were canceled or added. As a result, claims 1-42 remain pending in this application. Reconsideration of this application in view of the above amendments and the following remarks is requested.

Interview Summary

Applicant thanks Examiner Boris Leo Chervinsky for the courtesy of a telephone interview on April 23, 2007 with Applicant's representative Richard E. Billion. Applicant's attorney pointed out that two Kenny et al. references were cited and that the office action did not distinguish between the two. However, when applicant's attorney reviewed specific arguments in which the Examiner included references to the text of the Kenny et al. published application, it was clear that the Kenny et al. published application serial number 20040206477 was the reference the Examiner relied on.

Drawing Objection

Objection: The drawings were objected to on page 2 of the Office Action. The drawings were objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the memory device must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Response: The drawings show IC die 604 and IC die 624 attached to the substate. The IC die could include memory or may be memory. For example if the IC is a microprocessor, the microprocessor includes registers which, of course, are considered memory. In other die, there may be cache memory. Consequently, the applicant feels that the objection to the drawings under 37 CFR 1.83(a) is overcome, since the drawings show every feature of the invention specified in the claims.

Double Patenting Rejection

Rejection: Claims 1-42 were provisionally rejected under the non-statutory obviousness-type double patenting over claims 1-46 of co-pending Application No. 10/903,185. According to the Examiner, this "...is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented." (underlining in original—see paragraph 3, page 3 of the office action dated January 23, 2007).

Response: Because this is a provisional rejection, Applicant prefers to hold any action in abeyance until claims 1-46 of co-pending Application No. 10/903,185 are allowed.

§103 Rejection of the Claims

Rejection: Claims 1-42 were rejected under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al.

Response: In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference or references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *M.P.E.P.* § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir. 1991)).

Claim 1 recites "An apparatus comprising...a plurality of micropins thermally coupled to the substrate, the plurality of micropins arranged in a pixel like pattern over the substrate, the micropins positioned to cause a fluid passing through the plurality of micropins to travel a nonstraight path." The Examiner admits that the Kenny et al. reference does not disclose "...the micropins arranged in a pixel-like pattern." (See paragraph 5, bottom of page 4 of the Office

Action dated January 23, 2007). The Examiner then cites the Cannell et al. reference for pins arranged in a pixel-like pattern. Applicant contends that the Kenny et al. reference fails to show that the micropins positioned to cause a fluid passing through the plurality of micropins to travel a nonstraight path. The heat exchanger of Kenny et al. minimizes includes channels that minimize fluid flow in the X and Y directions. The channels 322 of Kenny et al. force the fluid to travel in the Z direction along the wall of the pillar 303. One of the objects of minimizing the travel of the fluid in the X and Y direction is to minimize pressure drop across the heat exchanger. According to the Kenny et al. reference:

> "Generally, the preferred heat exchanger 300 minimizes the pressure drop within the heat exchanger using the delivery channels 322 in the manifold layer 306. The delivery channels 322 are vertically positioned within the manifold layer 306 and vertically provide fluid to the interface layer 302 to reduce the pressure drop in the heat exchanger 300. As stated above, pressure drop is created or increased in the heat exchanger 300 due to fluid flowing along the interface layer in the X and Y directions for a substantial amount of time and/or distance. **The manifold layer 306 minimizes the flow in the X and Y directions by vertically forcing the fluid onto the interface layer 302 by the several delivery channels 322. In other words, several individual jets of fluid are applied directly onto the interface layer 302 from above. The delivery channels 322 are positioned an optimal distance from one another to allow fluid to flow minimally in the X and Y directions and vertically upward out of the interface layer 302.** Therefore, the force of individual fluid paths from the optimally positioned channels 322 naturally cause the fluid to flow in an upward fluid path away from the interface layer 302. In addition, the individual channels 322 maximize the division of fluid flow among the several channels 322 in the interface layer 302, thereby reducing the pressure drop in the heat exchanger 300 while effectively cooling the heat source 99. In addition, the configuration of the preferred heat exchanger 300 allows the heat exchanger 300 to be smaller in size than other heat exchangers, because fluid does not need to travel a large amount of distance in the lateral X and Y directions to adequately cool the heat source 99." (Emphasis added--See paragraph [0103] on page 12 of the Kenny et al. reference.)

The Kenny et al. reference, therefore, teaches the use of a manifold to force fluid flow in the Z direction and minimize the flow in the X and Y directions. The Cannell et al. reference shows the flow across the pillars. However, one would not modify Kenny et. al. to the Cannell et al. flow arrangement since doing so teaches against minimizing the flow in the X and Y directions. Doing so would destroy the Kenny et al. reference.

The destruction of the Kenny et al. reference is also evidence against any reason or suggestion to combine the teachings of Kenny et al. and the teachings of Cannell et al. to yield the applicant's invention.

Even if one was to modify Kenny et al. as suggested by the Examiner, the pillars in Cannell et al. are arranged in straight rows to allow straight flow. Therefore, even if one was to combine the two references, the result would fall short of the applicant's invention of claim 1, which includes producing a non straight flow.

Claim 1 also now includes a limitation regarding the spacing of the micropins. It will be appreciated that support for this limitation can be found on page 4, paragraph 16 of the specification of this application.

For all of the above stated reasons, applicant respectfully submits that claim 1 now overcomes the Examiner's rejection of claim 1 under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al. since the Examiner has failed to make a proper *prima facie* case of obviousness.

Claims 2-16 and 36-39 depend from claim 1 and include the limitations of claim 1. As a result, applicant submits that the Examiner also fails to make out *a prima facie* case of obviousness with respect to claims 2-16 and 36-39.

Claim 17 recites "...a device...comprising: a substrate, and a plurality of micropins thermally coupled to the substrate, the plurality of micropins arranged to facilitate flow of material across the plurality of micropins in at least two directions, and arranged in a pixel like pattern over the substrate." The Kenny et al. reference does not teach a device that allows flow across the plurality of pins. The Kenny et al. reference minimizes flow in the X and Y direction by using the manifold to limit fluid flow to a single direction, mainly the Z direction over the walls of the pilllars. The pillars are also not arranged to facilitate flow in at least two directions. The flow is limited to one direction, the Z direction, in the device of Kenny et al. The Examiner proposes combining Kenny et al. with Cannell et al. However, doing so would destroy the Kenny et al. reference. This is evidence against a teaching or suggestion for modifying the reference. In addition, even if one was somehow to combine Cannell et al. with Kenny et al., the resulting structure would fall short of the invention of Claim 17, since the Cannell et al. pillars are arranged in nice rows to allow fluid to flow straight through the pillars. As a result, the

Examiner has failed to set forth a *prima facie* case of obviousness and the invention of claim 17 now overcomes the Examiner's rejection of claim 17 under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al.

Claims 18 - 21 depend from claim 17 and include the limitations of claim 17. As a result, applicant submits that the Examiner also fails to make out *a prima facie* case of obviousness with respect to claims 18-21.

Claim 22 recites "...a plurality of micropins thermally coupled to the substrate, the plurality of micropins arranged in a pixel like pattern over the substrate, the micropins positioned to cause a fluid passing through the plurality of micropins to travel a nonstraight path..." Claim 22 overcomes the Examiner's rejection under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al. for the same or similar reasons as set forth in arguing the patentability of claim 1 above. Claims 23-30 depend from claim 22 and now also overcome the Examiner's rejection under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al.

Claim 31 recites "An electronic system comprising...a plurality of micropins thermally coupled to the substrate, the plurality of micropins arranged to facilitate flow of material in a nonstraight path across the plurality of micropins in a pixel like pattern over the substrate, and substantially enclosed in a device, the device having an inlet and an outlet..." Claim 31 overcomes the Examiner's rejection under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al. for the same or similar reasons as set forth in arguing the patentability of claim 1 above. Claims 32-35 depend from claim 31 and now also overcome the Examiner's rejection under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al.

Claim 40 recites "...a cover disposed over the sidewalls of the substrate, the cover including a plurality of micropins coupled to the cover, wherein the micropins are thermally coupled to the substrate when the cover is disposed over the sidewalls of the substrate, the micropins arranged to facilitate flow of material across the plurality of micropins in at least two directions, and arranged in a pixel like pattern over the substrate." Claim 40 overcomes the Examiner's rejection under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al. for the same or similar reasons as set forth in arguing the patentability of claim 17

above. Claims 41 and 42 depend from claim 40 and now also overcome the Examiner's rejection under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al.

For all of the reasons set forth above, the Examiner's rejection of claims 1-42 under 35 USC § 103(a) as being unpatentable over Kenny et al. in view of Cannell et al.is overcome.

Reservation of Rights

In the interest of clarity and brevity, Applicant may not have addressed every assertion made in the Office Action. Applicant's silence regarding any such assertion does not constitute any admission or acquiescence. Applicant reserves all rights not exercised in connection with this response, such as the right to challenge or rebut any tacit or explicit characterization of any reference or of any of the present claims, the right to challenge or rebut any asserted factual or legal basis of any of the rejections, the right to swear behind any cited reference such as provided under 37 C.F.R. § 1.131 or otherwise, or the right to assert co-ownership of any cited reference. Applicant does not admit that any of the cited references or any other references of record are relevant to the present claims, or that they constitute prior art. To the extent that any rejection or assertion is based upon the Examiner's personal knowledge, rather than any objective evidence of record as manifested by a cited prior art reference, Applicant timely objects to such reliance on Official Notice, and reserves all rights to request that the Examiner provide a reference or affidavit in support of such assertion, as required by MPEP § 2144.03. Applicant reserves all rights to pursue any cancelled claims in a subsequent patent application claiming the benefit of priority of the present patent application, and to request rejoinder of any withdrawn claim, as required by MPEP § 821.04.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney ((612) 373-6977) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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Date 4/23/07

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: MS Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 23rd day of April 2007.

CANDIS BUENDING

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Signature